

Library
University of Md.
Campus

LIBRARY
AUG 21 1945

The Maryland Fruit Grower

Published Quarterly by the Maryland State Horticultural Society
Edited by the Secretary, A. F. Vierheller, Extension Horticulturist
College Park, Maryland.

Vol. 15

July-AUGUST-September, 1945

No. 3

A FEW ORCHARD MANAGEMENT PRACTICES THAT ARE AN AID IN CODLING MOTH CONTROL

C. L. BURKHOLDER

Purdue University Agricultural Experiment Station

Thirty years ago, we talked about pruning largely as a method of promoting the formation of large sturdy trees. Today these same tall, broad trees have been a big factor in bringing about a scourge of insect and disease problems that threaten the entire financial success of the apple industry in many areas.

During the rather recent low price period, many growers began removing some of their oldest blocks of trees. However, as soon as prices went up, this sound management practice has been largely discontinued. The old, tall, broad-topped trees are again becoming pest nests and money sink-holes. Considering the present acute shortage of spraying equipment and trained spraymen, isn't it well worthwhile to continue the old tree removal program? An old horse can be turned out on pasture and is harmless. An old apple tree is just good pasture for the very orchard pests you are trying to exterminate in the younger areas of your orchard.

Pruning Out the Center Tops

I know you have a severe shortage of pruning labor. But you do have enough to spend at least 20 minutes on each tree next spring. I can almost hear many of you saying to yourself, "What can a person accomplish in 20 minutes?" The answer is you can take out the branch canopy in the center top where spray coverage is almost always scanty and first brood codling moth numerous and healthy.

We have a block of mature York trees at our Bedford farm that are typical of the variety, in that they are tall, broad-top trees, the center tops of which having always been difficult to cover thoroughly with spray material. In late June of 1942, it was found that there were entirely too many wormy fruits in the top fourth of these trees and especially was this true of the center top. Regardless of consequences, it was decided to remove the branches in the center top which seemed to be a special pest nest, and which were next to impossible to spray thoroughly. One 3 inch branch, which formed a canopy in the top of one of these trees carried 20 wormy fruits. In another tree, eight branches ranging in size from 1 to 3 inches carried 109 immature first brood larvae.

The following year, I was checking up on my own spraying work at Lafayette and was thoroughly disgusted with the spray coverage in the tops of the trees after the first cover spray had been completed. There were two rows of mature broad top Jonathan trees in this plot on which the coverage was especially poor and I decided to prune out the branches in the center top the same as the York block at Bedford. It required an *average of 17 minutes per tree to do this job*. No attempt was made to prune any other area of the trees.

After the fourth cover spray had been completed, we took spray residue samples from the tops of both the pruned and unpruned trees, as well as samples from the bottoms of the trees. The arsenic load per pound of fruit was determined by O. W. Ford and E. D. Schall of our Agricultural Chemistry Department. These figures show that spray deposit was nearly as good in the tops of the pruned trees as around the bottom of the trees while the same old relationship existed between the top and bottom of the unpruned Jonathan row. These figures are shown in Table 1. The total arsenic load varies quite widely as between plots because of the different programs used, but the much higher spray deposit on the samples from the tops of the pruned trees is consistent in all plot treatments.

TABLE 1

The Effect of the Center Top Removal on the Spray Deposit After 4th Cover

Plot	Location of Sample	Grains Arsenic per Pound Fruit	Pruning Treatment
7	Bottom	.237	Center top removed
	Top	.258	Center top removed
	Top	.164	No pruning
6	Bottom	.380	Center top removed
	Top	.351	Center top removed
	Top	.234	No pruning
5	Bottom	.235	Center top removed
	Top	.235	Center top removed
	Top	.117	No pruning
4	Bottom	.263	Center top removed
	Top	.234	Center top removed
	Top	.188	No pruning
2	Bottom	.259	Center top removed
	Top	.242	Center top removed
	Top	.135	No pruning

Now I know you are wondering what happened to the exposed scaffold branches when the branch canopy was removed. Did this result in a serious outbreak of sun scald? I was quite concerned over this possibility myself and, therefore, have thoroughly examined all these trees several times. I have been surprised and pleased at the very small amount of injury which has appeared in 2 seasons. Where a scaffold branch has an elbow directly exposed to the sun, a short patch of bark killing has sometimes developed. Such areas could have been quickly and cheaply protected by applying a whitewash of skimmed milk and lime.

No matter how hard you try or how much you talk to the spray crew about giving special spraying attention to the center top of the trees, *it just can't be thoroughly covered* in the case of mature trees. In orchards where *codling moth* are a problem, I just haven't a bit of respect for that portion of an apple tree and all too frequently the center top of these same trees is the source of much of our secondary scab infection.

Top-Off Sprays

Now I have been willing to acknowledge that I have personally had lots of difficulty in my own efforts to lay down as much spray material in

Results
commer
STAF
it'll
anc
'sp
eas
pro
win

Results
commer
STAF
pays off
orchard
packs" I
wise, to
fruit on
It's me
Nature
up" the
out pick
"spot p
ing labo





STAFAST holds 'em on...

"I'm using STAFAST again. I know it'll spread picking time and practically eliminate 'spot picking' thus easing my labor problem. Cuts down windfall losses, too."



GET BETTER COLOR AND SIZE...

MORE OF THE MONEY FRUIT—USE

THIS *Pre-Harvest Spray Material*

Results at picking time have given the commercial grower *orchard proof* that the STAFAST pre-harvest spray application pays off in *money fruit*. In apple and pear orchards the country over, "STAFAST packs" have shown what it means, *market-wise*, to cut down windfall losses and hold fruit on the trees for top color and size. . . . It's merely a matter of giving Mother Nature more time to "color up" and "size up" the crop. STAFAST helps to spread out picking time and practically eliminates "spot picking," too—a real advantage during labor shortage!

Here's why STAFAST is the "standout" in hormone spray efficiency: it's high in active ingredients . . . it's the pre-harvest spray with naphthalene acetic acid *plus*. STAFAST has "built in" wetting and adhesive agents for maximum mixing, spreading, and sticking. It does not require the addition of oil; comes in dry powder form for *complete stability* under all conditions!

Easy to use too—merely sifted into the spray tank. So be *market wise* . . . be ready with STAFAST. Order it from your Orchard Brand Dealer *today!*

*Reg. U.S. Pat. Off.



GENERAL CHEMICAL COMPANY
40 RECTOR STREET • NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.)
Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston
Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh
Providence (R. I.) • San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee
(Wash.) • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

the top third of mature apple trees as around the bottom half. The suggestion has been made that completely removing as much as possible of this inaccessible wedge of branches in the center top will help the spray coverage in the top third of the tree. I would like to make one additional suggestion, especially for those growers who have a serious codling moth problem confronting them in 1945 and also to those growers who are handling scab susceptible varieties such as Delicious, Rome, and McIntosh—*It is to apply several extra top-off sprays to just the top third of the trees in their problem blocks.* In Indiana and Illinois, a top-off spray is suggested immediately following the calyx spray and again between the third and fourth covers or immediately following the fourth cover. Codling moth lay more eggs in the top third of the trees than they do on the bottom third. Primary apple scab lesions are always most numerous in the top third of mature trees. Therefore, why isn't it just plain horse sense to make every reasonable effort to keep the spray deposit in the top third of the trees up to the average of that around the bottoms?

Let's take a few minutes to actually find out what happens when a special top-off spray was applied, after the regular fourth cover, in one of our University orchards in southern Indiana. In Table 2 the amount of arsenic per square inch of apple surface was very little over half as much on the samples from the top of the trees as compared with the bottom samples. A top-off spray, applied to just the top half of the trees approximately doubled the spray deposit on the top fruit while in this orchard at least, the spray deposit on the lower half of the tree was adequate to give protection against codling moth entrances.

TABLE 2
Arsenical Spray Deposit in Tops and Bottoms of Mature Apple Trees
Before and After the 4th Cover "Top-Off"

Variety	Where and When Sampled	Micrograms of Arseni- cal per Square Inch
Winesap	Bottom—before top-off	45.47
Winesap	Bottom—after top-off	50.76
Winesap	Top—before top-off	29.22
Winesap	Top—after top-off	43.92
Grimes	Bottom—before top-off	62.95
Grimes	Bottom—after top-off	77.01
Grimes	Top—before top-off	31.86
Grimes	Top—after top-off	69.33

To further illustrate this very important point of top and bottom spray covering, I am going to move over into Illinois. For the past three seasons, Prof. S. C. Chandler has been conducting a very valuable study of spraying methods in 13 representative Illinois commercial apple orchards. In 1944 his data shows that the harvest lead residue in fruit samples from the tops of the trees in the 13 orchards averaged only 63 percent of that found on the bottom samples. What about codling moth entrances? His figures show a ratio of two first-brood entrances in the top to one entrance around the bottom and a ration of 1.5 harvest entrances on the apples in the top of the trees to one around the bottom. The effectiveness of the first-brood codling moth control will always be the yard-stick which provides the clue to the final harvest infestation. If two first-brood worms enter the fruit in the tops of the trees to one around the bottom, you growers can do something about it. Changing from one spray program to another isn't the answer. Special pruning to eliminate as much as possible of the center top and to reduce the over all height of the trees is one answer. Making several in-between spray applications to better fortify the top third of the trees is a second answer.

WE ARE NOT CONTROLLING PEACH TREE BORER SUFFICIENTLY to hold down our losses from weak or dead trees. Probably most peach growers are a little sick of the peach deal with its soft, watery peaches, poor carrying qualities, hail injury, brown rot, freeze losses, worms, and several other things that happened to the 1945 crop. But there are other years ahead. The trees are planted and are bearing, or will bear future crops. We can't get rich on poor trees. Every weak tree or dead tree is a loss. We have written up peach borer control every year, and had resolved to skip it this year, but losses are too heavy from this insect so here we go again.

In any battle the idea is to hit the enemy at his weakest point. The weakest point in the life-history of peach borer is in its childhood, or worm stage. Now, let's see how the borer operates. Right now (August) the borers are flying around, and probably some of them have laid some eggs around the bases of peach trees. At any rate, they will soon begin egg-laying, and will continue well up into September. The adult borers look like wasps, unless you know them by sight. They are really clear-winged moths. Now, after the eggs are laid around the tree bases, they hatch out and the tiny worms begin working into the bark. Here is our chance. Suppose we are going to use the para-di-chloro-benzene crystals. About mid-September we clear the trash away from the base of the tree, trying not to break the ground crust any more than necessary, then we try to smooth the soil and make it as level as possible. DON'T remove too much soil from the tree base, and if necessary throw some more soil around the tree and tamp it down. The idea is to keep the soil surface ABOVE the point where the eggs are laid, as the gas liberated by the crystals goes down, being heavier than air. Now the tree is ready for treatment. Place the crystals in a circle about the tree base, about an inch from the trunk, and cover them with a few shovelfuls of loose dirt. Be careful not to push any of the crystals against the trunk, as they will burn the bark. Now throw more soil against the tree and build up a mound three or four inches high. Then tamp well with the back of the shovel. If the soil is sufficiently warm (60° or above) the gas is liberated from the crystals, and flows to the tree and down the trunk underground. The University of Maryland entomologists suggest use of 1 1/2 ounces per tree on large trees; 3/4 of an ounce on trees four or five years old; and 1/2 ounce on trees 1 to 3 years old. Don't guess at the amounts. Get a small can and cut it down so that it holds the desired quantity. Then simply fill it, smooth it off, and you have the right amount of material to use. Leave the mounds up all winter and BE SURE to remove them in early spring. Otherwise, the next eggs are laid at the surface and the new borers dig in higher up the trunk. Then next fall, it is necessary to build up the soil high enough to apply crystals above these borers.

There is also the liquid para-di-chloro-benzene treatment, where the material is dissolved in oil. (See B. G. Pratt ad on Page 8, Maryland Fruit Grower, August 1945). Water is added to the stock solution and the material is applied with a dipper. Using this, it is not necessary to smooth away from the tree base, but the trash should be removed. Pour the solution on the soil around the trunk base, and pour some material down the trunk if desired. Then mound up as in cases where crystals are used. Growers have used this convenient method with good results. Since the dissolved material is rather volatile, it may be used with good results when applied later than the crystal method. However, borer treatment should not be delayed. Do it on time.

The use of another liquid material called ethylene dichloride has caused injury, as it is affected by soil moisture, heavy soils, cracks in soil and around tree trunks, and also by lack of keeping material stirred while using it. It is recommended only in the hands of careful workers.

No matter what material is used be sure to follow manufacturer's directions explicitly.

Now what happens to the borers that are not controlled? Well, they just work around under the bark during the winter and spring, becoming big, fat grubs about an inch long. If there are enough of them in the tree, they may girdle the tree entirely. They feed until early June, then build a dirty-looking cocoon or case on the tree surface, at or below the ground surface. They emerge from this case as wasp-like moths during July, August, and early September, and then they lay more eggs on the tree trunks, ready for more damage the next winter. From this, we can see that spring treatment may have some value, but the greater damage has been done during the winter.

Here are a few DON'TS:

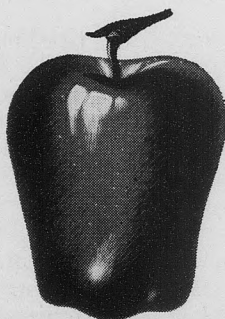
Don't delay treatment. Don't use too much nor too little material. Don't do a careless job. Don't neglect pulling mounds down in the spring. Don't experiment. Follow directions. They are the result of experiments. Don't neglect to check up on the orchard laborers occasionally, to see if they are doing the job right. Don't expect 100% kill as some borers seem to get by, but not many of them will survive if the job is done well.

(Approved by Department of Entomology, University of Maryland).

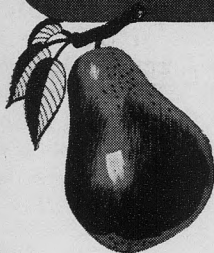
THE PEACH CROP IS MOVING about two weeks ahead of schedule. This season will long be remembered as a difficult one for peach growers. First came the general frost, followed later by a heavy freeze in Western Maryland, leaving peaches only on the higher ground. Then came hail damage, both early and late, and the damage was scattered over most of the State. Then came a record of wet weather with high winds that limb-rubbed a lot of fruits. Some spray injury crept in, too. Now come reports of great losses from brown rot, and along with it, the "constriction disease" is doing considerable tree damage. In this disease, the smaller limbs and twigs develop gummy spots, and portions of the limbs or twigs are constricted so the leaves beyond the injury seem to lose color and wilt. Some of the affected parts break off or the terminals beyond the injured section may die. Nothing can be done, now, and this disease and possible control will be discussed in a later news-letter. Then, to add to all these troubles the Oriental moth has been very active in some orchards. Apple growers have had their troubles, too, with spray injury, unusual numbers of spray applications, and the scab disease and codling moth have not been too easy to keep under some degree of control.

A. F. Vierheller
Extension Horticulturist.

It's time for
APP-L-SET
in the



Dow Control Program



PICK 'EM WHEN YOU WANT 'EM

Cut wind loss and preharvest drop of apples and Bartlett pears with App-L-Set . . . keep your fruit on the trees till it reaches top market quality. App-L-Set lengthens your picking period, too . . . eliminates "spot picking" to a great extent . . . helps simplify your labor problem. One spraying is effective for nine or ten days.

App-L-Set Dust is available for those who prefer to dust rather than spray.

See your dealer or state experiment station for details.

Complete Control



for entire season

THE DOW CHEMICAL CO.

MIDLAND, MICHIGAN

A Few Important Facts From the 1944 Illinois Entomology
Department's Survey of 13 Representative Commercial
Apple Orchards*

Ratio of Codling Moth First Brood Entrances in Tree Tops vs. Bottoms 2 to 1	Ratio of Codling Moth Harvest Entrances in Tree Tops vs. Bottoms 1.5 to 1	Ratio of Harvest Lead Residue in Tree Tops vs. Bottoms 1 to 16
--	--	--

*Survey conducted by Prof. S. C. Chandler. Residue analyses by Dr. W. A. Ruth.
Thinning as an Aid in Codling Moth Control

Now just one more suggestion, especially for the grower whose codling moth population has been increasing. One of the most neglected orchard practices in recent years has been thinning. I don't care to discuss thinning as it relates to color, size and production. However, I would like to ask you what happens when two apples touch. I think you will agree with me that it seems almost impossible to prevent codling moth larvae from entering between touching fruits regardless of the spray materials used or the way they are applied. Like the brushy center top, clusters of apples provide ideal headquarters for codling moth. Thinning also offers an excellent opportunity to remove and destroy fruits containing first-brood codling moth larvae. Robert Burns has said, "The best laid plans of mice and men gae oft astray". Unfortunately, the only way these first-brood larvae can be destroyed, once they have actually entered the fruit, is to pick them off by hand. I hope your codling moth problem will never reach such a serious stage and the rigors of the remedy should be a warning to wise fruit growers not to let this pest get out of hand. When the codling moth population begins to increase in your orchard, it should serve as a Big Red Flag, warning you of the dire necessity of immediately increasing the effectiveness of your control program. When the red flag goes up, too many growers immediately change spray materials while the fact of the case is the same materials will usually do the work on (1) moderate-aged trees, (2) if the center tops of the trees are removed and tall branches brought down into range of the spray gun and (3) if the spray fortification in the top of the trees is reinforced by some extra top-off spraying. Let's "give the devil his dues", but at the same time, let's not lay all our troubles on the doorsteps of Spray Material and Spray Machinery Manufacturers!

EDITOR'S NOTE—We agree heartily with opinions expressed in the above article. Top-off sprays have shown their real value where used in Maryland orchards. There is no doubt that better pruning is needed over the entire average tree in Maryland. Only one word of caution is given regarding opening the tops of the trees. We seem to have a peculiarly hot winter sun that causes scalding of bark on newly-exposed limbs or branches, and we have all too many cases where such scalding has allowed black rot to start which later kills the entire branch and eventually the entire tree. We prefer a thinning out of smaller branches in the tree tops to open the tops, and we suggest that the entire trees be given the thinning-out treatment confining the cuts to removal of smaller branches as much as possible. One fact is clear, and that is that we must prune trees to allow for better spray coverage and this in turn will encourage more efficient performance of fruit spurs with improved quality and quantity production.

Have You Read the Advertisements?

In
meeting
State s
Washin
seconds
it off an
of the t
down th
off. To
they av
differen
recordin
picked v
two or
to pick
left han
contain
In
differen
grower
another
100 bus
damage
near the
scatter c
hold a
seemed
and to t
the pick

"To
acres of
spray no
continue
as you a
dripping
inside-o
limbs to
legs) at
coating
an effort
when he
Some gr
of the t
the oper
the outs
cover fru
If y
to bleat
corner a
turn eac
sprayed
contribu

PICKING APPLES

In a growers' discussion of picking methods during the recent winter meeting of Michigan State Horticultural Society, the findings of a Washington State survey on apple picking methods were reported. It was found in Washington State that an experienced picker will pick an apple every $2\frac{1}{4}$ seconds of which $1\frac{1}{2}$ seconds were required to reach for the apple, break it off and place it in the container, and about $\frac{3}{4}$ of a second or about 30% of the time spent in harvesting was spent in setting the ladder, going up and down the ladder, emptying the apples into the field crate and leveling them off. Ten experienced pickers could pick from 75 to 200 boxes a day, and they averaged a little over three minutes in picking a box of apples. The difference in pickers was a difference in temperament of the picker. In recording the picking of over 5,000 apples, it was found that 43% were picked with the left hand and 57% with the right hand. Pickers that picked two or three apples in one hand before placing them in the container tended to pick more apples with the right hand. They picked singles with the left hand, and one or two with the right hand before placing them in the container. Speed of action, however, was found to be the important thing.

In the grower discussion regarding picking of apples there was much difference of opinion regarding piece work or hourly pay. While one grower found that 25% to 30% more apples were picked by piece work, another grower preferred to have pickers who carefully picked not over 100 bushels a day, and preferably 60 to 75 bushels, as he found more damage to hastily picked fruit. A plentiful supply of field crates located near the pickers was an essential, and some growers used rainy days to scatter crates in the orchard. There was even talk of larger crates that would hold a bushel without loss of time in leveling off the fruit. One grower seemed to get better work done by visiting among the pickers to say "hello", and to take an interest in them. It was also stated that thinning speeds up the picking job, as the culls do not have to be handled.

ABOUT SPRAYING

"Tennessee Horticulture," May-June, 1944, tells of a supervisor of 1200 acres of orchard in Illinois, who insisted that a spray gunman not open the spray nozzle until he could *touch the tree trunk with his foot*. The article continues: "The usual practice is to spray the side of the tree nearest you as you approach it, to save time. Don't kid yourself. Once this spray starts dripping down inside the tree, even a conscientious sprayman will slight the inside-out spraying. Some growers train their trees or sacrifice some low limbs to make it easy for a sprayman to reach the trunk (on his hind legs) at one of 2 or 3 places. From here he proceeds to spray outward, coating the under side of leaves and the inner side of the fruits, and makes an effort to force some of the spray out through openings in the top. Then, when he comes out he starts with the top, and finishes with the lower limbs. Some growers spray the top from all sides before starting on the lower half of the tree. In either case, it is best to start and finish on the lee side, so the operator stands quartering the direction of the wind. In spraying from the outside, too, an effort should be made to direct spray into openings to cover fruits, partially concealed by foliage.

If you have been kidding yourself in your spraying and find occasion to bleat about an overlarge cull pile take a bushel of culls over into a quiet corner and analyze them. Line up a row with the defective sides up, then turn each one over and see how many are culls on one side only. Both half-sprayed and unsprayed fruit make up the cull pile, but the former may contribute the larger part."

Control Peach Borers

the Safe Way

You can control peach borers with far less labor and time than the old crystal method by using Para-Scalecide—a liquid method of applying paradichlorobenzene. It has a 13-year record of safety and effectiveness that is unequalled by any other method. Millions of peach trees—both young and old—are treated with Para-Scalecide each year.

Simply dilute Para-Scalecide 1 to 7 parts water and pour or spray against the base of the tree. Promptly throw a few shovelfuls of earth against the base to hold the fumes.

Apply in the late Summer or early Fall, while the ground temperature is 60 degrees or warmer. May also be used effectively in the Spring. One gallon of Para-Scalecide treats 42 full-grown trees or 128 two-year-old trees.

Order Para-Scalecide now, and be ready in time for safe, simple, sure control of peach borers. Your dealer has Para-Scalecide, or will get it for you. Ask for descriptive folder.

The Georgia State Board of Entomology after testing Para-Scalecide states:—"All borers found were dead and mostly decomposed, and there was no bark, cambium or other injury to the trees."

A grower in the heart of the great Central Georgia Peach Belt says, "Para-Scalecide has been used here for many years on both young and old trees. Complete control and no injury is the unanimous verdict."

B. G. PRATT COMPANY

Manufacturing Chemists

160 Moore Street, Dept. "F", Hackensack, N. J.

Manufacturers of Scalecide, Para-Scalecide, Spray Catalizer, Spra-Cream, Summer Spra-Cream, D-X



The Dipper Method
PARA-SCALECIDE
is Safe, Simple, Sure

Mar
Re

74

Pub

Vol. 1

It
must be
of the
also on
are infl
showing
is in tu
ments s
of goitr

tion, ha
"B
phorou
deficien
and ma
people
high-lin

"L
quality
greatest
erals).
tion. T
content

"T
decaying
physical
Plains a

"T
tant ele
land is
in food
with hig